

REMARKS

The above amendment is made in response to the Final Office action mailed on June 5, 2008 and the Advisory Action mailed on October 14, 2008. The Examiner's reconsideration is respectfully requested in view of the above amendment and the following remarks.

Claims 1 and 2 have been amended to more clearly define the subject matter of the claimed invention. Claims 3-16 have been canceled, without prejudice. No new matter has been introduced by these amendments.

Claims 1 and 2 are thus pending in the present application.

Claim Rejections Under 35 U.S.C. §112

Claims 3, 4 and 11-13 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claiming the subject matter which the applicant regards as his invention. The Examiner has stated, regarding Claims 3, 4 and 11-13, that the limitations "preparing an alloy of a primary metal and a secondary metal" and "to form an alloy-catalyst" are not supported by the specification.

Applicants have cancelled Claims 3, 4 and 11-13.

Claim Rejections Under 35 U.S.C. §103

Rejection on Claims 1, 2, 9 and 10

Claims 1, 2, 9 and 10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Baker et al. (US 2002/0054849; hereinafter, "Baker").

In order for an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the

skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996). See MPEP 2143.

Establishing a prima facie case of obviousness requires that all elements of the invention be disclosed in the prior art. *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970). Further, even assuming that all elements of an invention are disclosed in the prior art, an Examiner cannot establish obviousness by locating references that describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would have impelled one skilled in the art to do what the patent applicant has done. *Ex parte Levensgood*, 28 U.S.P.Q. 1300 (Bd. Pat. App. Int. 1993). The references, when viewed by themselves and not in retrospect, must suggest the invention. *In re Skill*, 187 U.S.P.Q. 481 (C.C.P.A. 1975).

Applicants have amended Claims 1 and 2 to more clearly define the subject matter of the claimed invention. Claims 9 and 10 have been cancelled.

The amended Claims 1 and 2 include, *inter alia*, the following limitation:

“having two directional growth axis to grow two units of carbon nanofibers” and
“the two unit carbon nanofibers are combined by inter-fiber force or van der Waals force, forming pair structure as a single body” (Emphasis Added)

As above, the claimed fibrous nanocarbon includes two units of carbon nanofibers, which are grown along two directional growth axis. Further, the two unit nanofibers are combined to form pair structure as a single body (hereinafter, referred to as a “pair structure”), as shown in modeled diagrams of Figs. 4 and 13, and Figs. 8 and 9A of this application. Applicants represent further SEM photographs showing applicant's pair-structured fibrous nanocarbons (see SEM photographs A and B on pages 9 and 10 of this paper).

Baker is directed to a process for producing crystalline carbon nanofibers where the graphite sheets are grown in parallel to the longitudinal axis of the fiber. However, Baker is silent about applicant's pair-structure formed of two unit fibers. Further, Applicants respectfully note that this pair-structural feature (as recited in Claims 1 and 2) is not addressed in the Examiner's reasons for rejection regarding Claims 1 and 2.

It is therefore submitted that Baker fails to teach or suggest the subject matter claimed in Claims 1 and 2, and thus *no suggestion or motivation* exists in the cited reference. Accordingly, *prime facie* obviousness does not exist regarding the subject matter claimed in Claims 1 and 2 with respect to the cited reference. Applicants respectfully submit that Claims 1 and 2 are allowable over Baker.

On page 3 of the outstanding Final Office Action, the Examiner has stated that, since the processes of preparing the nanofibers are substantially similar, the product must also be substantially similar and have substantially similar properties, see MPEP 2112.01. Applicants respectfully disagree with the Examiner's statement and application of MPEP 2112.01. Further, it is respectfully noted that Claims 1 and 2 of this application are drawn to a product, reciting its physical properties and structures, not by a process.

MPEP 2112.01 states: "Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977)." MPEP 2112.01 further states: "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, the *prima facie* case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. *In re Best*, 562 F.2d at 1255, 195 USPQ at 433." (Emphasis added)

Here, the "claimed product" is a pair structure, but the "prior art product" (in Baker) is anything but a pair structure.

In Baker, there is no teaching or suggestion to anything about the applicants' claimed product (a pair structure). Further, there is no sign of intention, in Baker, to produce Applicants' claimed product (a pair structure). Furthermore, Baker does not disclose any process steps intended or attempted to produce the pair structure.

Therefore, Applicants submit that the prior art product (anything but a pair structure) does not necessarily possess the characteristics of the claimed product (a pair structure).

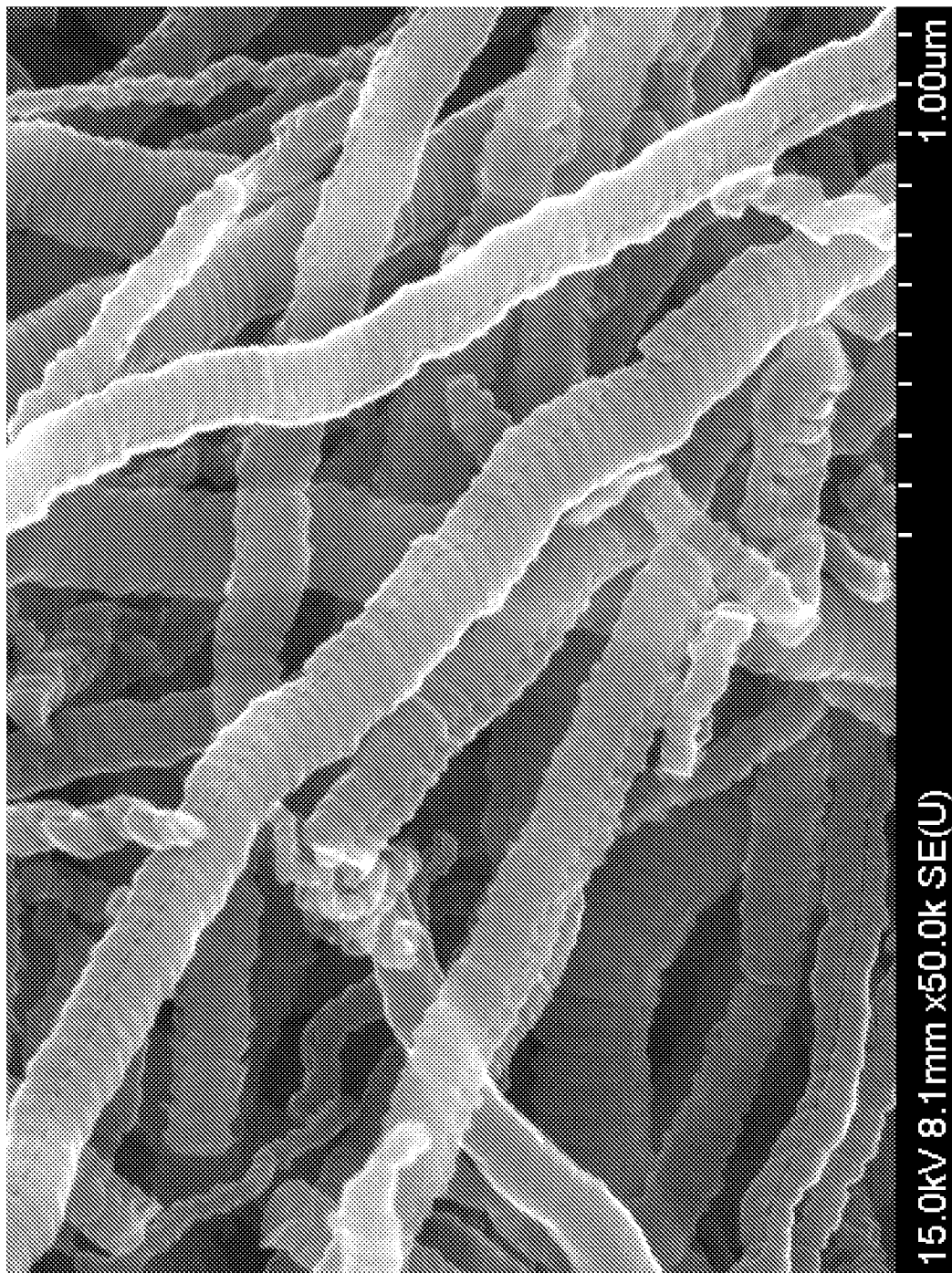
It is therefore respectfully submitted that *prime facie* obviousness does not exist regarding the subject matter claimed in Claims 1 and 2 with respect to the cited reference. Applicants respectfully submit that Claims 1 and 2 are allowable over Baker. Otherwise, Applicants respectfully request the Examiner to identify the prior art product, and then to show a sound basis for believing that the applicants' product (a pair structure) and the identified prior art product are the same, or produced by identical or substantially identical processes (not similar or substantially similar processes).

In addition to the above discussions, the applicants' disclosed process is different from that of Baker, in terms of many aspects. Among many others, Applicants represent the following two different points as follows. First, the present application uses Fe-Mn alloy catalyst (see pages 30-33 of this application). In contrast, Baker states in lines 1-4 of paragraph [0020] thereof: "The catalysts used to prepare the carbon nanofibers are bulk metals in powder form wherein the metal is selected from the group consisting of iron, iron:copper bimetallic, and iron:nickel bimetallic." In the examples of Baker, Fe or Fe-Cu catalyst is illustrated. Secondly, the present application reduces the alloy catalyst for 0.5 to 40 hours at a temperature range of 450 to 550°C (preferably 450 to 510°C) under gas mixture of 1 to 40 v/v% hydrogen (preferably 5 to 30 v/v% of hydrogen) and nitrogen, argon or helium (see lines 9 to 17 on page 31 of this application). In contrast, as shown in paragraph [0023] of Baker, Baker reduces the catalyst powder in hydrogen for 20 hours at 400°C.

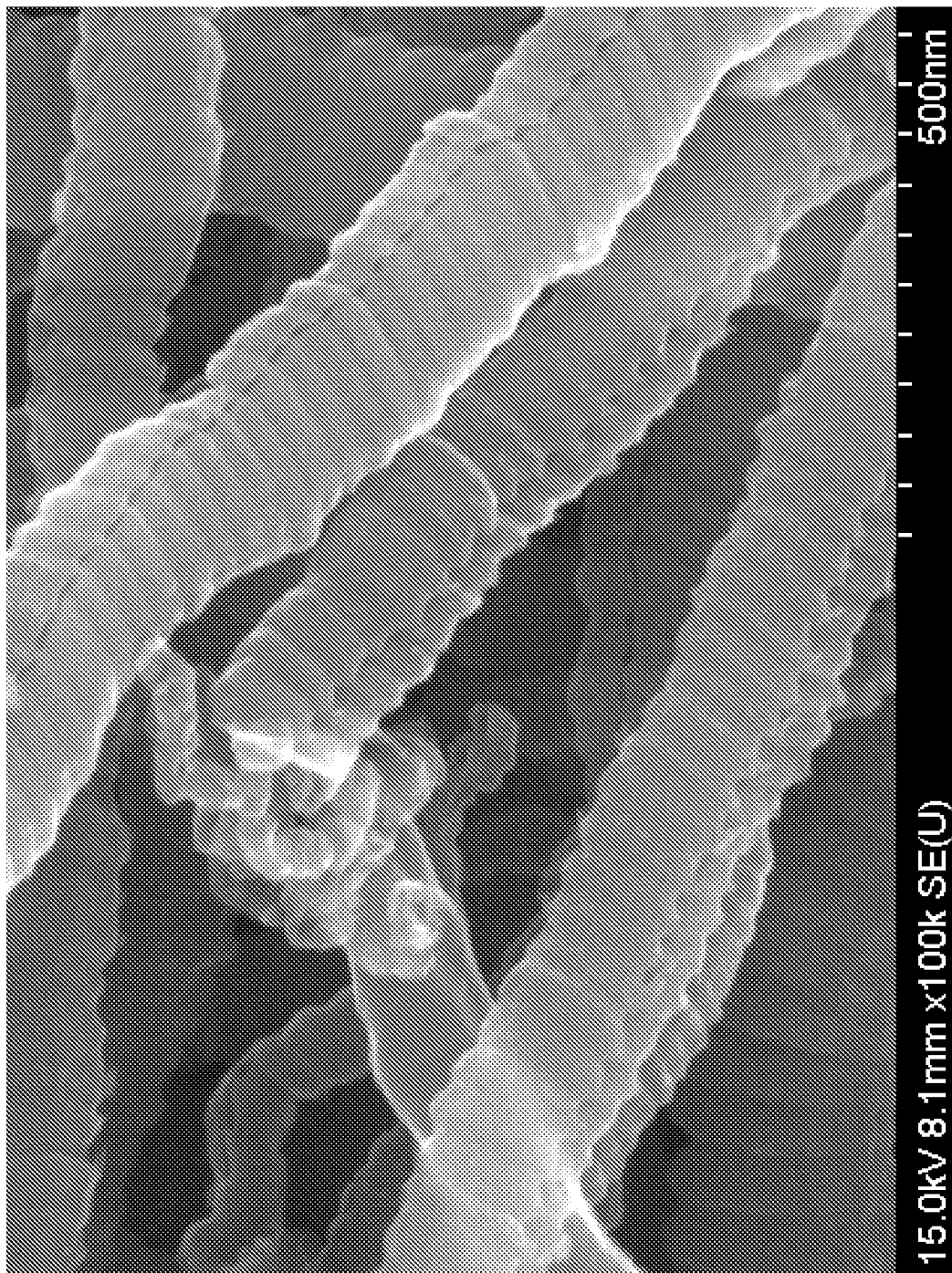
It is further noted that the structures of produced nanofibers are very sensitive to catalyst composition and process conditions such as temperatures, reaction atmospheres and the like. This is clearly evident from the Examples disclosed in Baker.

Applicants respectfully request the Examiner to review these submissions and withdraw the rejection on Claims 1 and 2 under 35 U.S.C. §103(a).

SEM Photograph A



SEM Photograph B



Rejection on Claims 3-8 and 11-16

Claims 3-8 and 11-16 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Baker in view of Baker, et al. (U.S. Patent 5,458,784) and Resasco (U.S. Patent Application Publication No. 2002/0131910).

Applicants have cancelled Claims 3-8 and 11-16.

Conclusion

In view of the foregoing, it is respectfully submitted that the instant application is in condition for allowance. Reconsideration and subsequent allowance of this application are courteously requested.

If there are any charges due with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicant's attorneys.

The Examiner is invited to contact Applicant's Attorneys at the below-listed telephone number with any questions or comments regarding this Response or otherwise concerning the present application.

Respectfully submitted,

CANTOR COLBURN, LLP

By: /Jaegyoo Jang/
Jaegyoo Jang
Registration No.: L0469

Date: November 5, 2008
Cantor Colburn LLP
1800 Diagonal Road
Suite 510
Alexandria, VA 22314
Telephone: (703) 236-4500
Facsimile: (703) 236-4501